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EXAMINER	
GREEN, RICHARD R	

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4174	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,328	MUHLTHALER ET AL.	
	Examiner	Art Unit	
	Richard R. Green	4174	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/1/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3-4, 9, 11-12 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

Regarding claims 1 and 18, the term "preferably" (lines 6 and 5 of the claims, respectively) renders the claims indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Regarding claim 3, the phrase "or similar" (last line) renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "or similar"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d). For the purposes of examination, any device in an aircraft requiring cooling will be considered.

Regarding claim 4, the phrase "in particular" (last line) renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the regulator

valve and the cooling system ("assigned to the cooling system," second line). To say that the regulator valve is assigned to the cooling system does not define any structural relation at all.

Claim 11 recites the limitation "the ventilator and/or the regulator" in the first/second line. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitations "regulation device," and "regulator valve" in the first and second lines. There is insufficient antecedent basis for these limitations in the claim.

Specification

The disclosure is objected to because of the following informalities:

Page 2, line 7, "because if its heat" should read "because of its heat."

Page 2, line 35, "section which the heat" should read "section with the heat."

Appropriate correction is required.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

"arrows 28" on page 8, line 36; page 9, line 9.

"arrows … 30b" on page 9, line 25.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

Figure 2: 16a, 26a

Figure 3: 10b, 16b, 21b, 26b

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because

reference character “14b” has been used to designate both “heat intake section" and “heat source” (page 9, lines 33 and 35).

reference character “10” has been used to designate both “container" and “pipe” (page 10, lines 22 and 28).

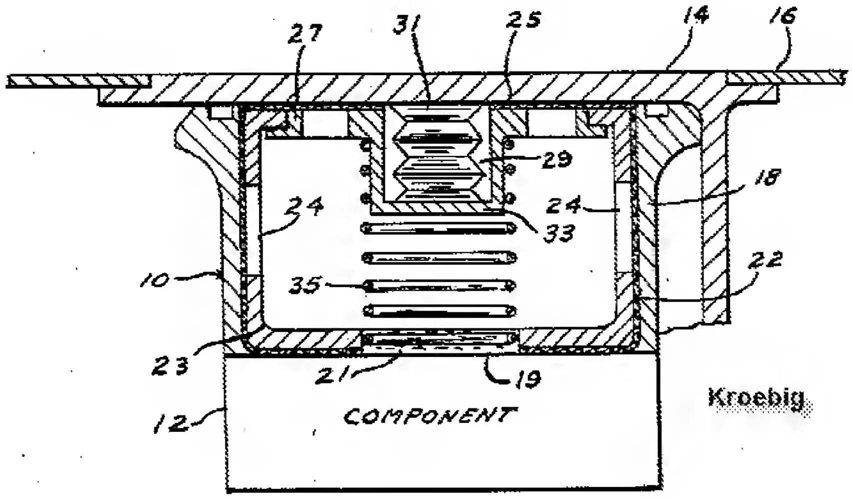
Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 and 13-18 are rejected under 35 U.S.C. 102(b) as being anticipated by US-4000776 to Kroebig et al. (hereafter Kroebig).



Kroebig

Claim 1: Kroebig teaches a cooling device for expelling heat from a heat source located in the interior of an aircraft ("component 12," col. 1, line 49) to a heat sink ("missile skin 16," col. 1, line 51), with a piping system ("heat pipe 10," col. 1, line 49) sealed against the surrounding atmosphere (it is considered to be), which is thermally coupled to a heat intake section ("evaporator section 19," col. 1, line 57) with the heat source and to a heat output section ("the heat pipe cover ... acts as the condenser," col. 2, lines 11-13) with the heat sink (col. 1, line 51- col. 2, line 10), and which preferably has an essentially adiabatic conveyance section ("wick 22," col. 1, line 55), whereby the piping system is filled with a heat conveyance medium ("liquid 21," col. 1, line 54) which, when it takes in heat from the heat source in the heat intake section undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section and here, when discharging heat to the heat sink, condenses once again and flows back into the heat intake section ("as the component temperature increases, it

causes an evaporation of the working fluid which flows to the missile skin where it condenses giving up its latent heat. The condensate is returned to the evaporator through the wick," col. 2, lines 13-18).

Claim 2: Kroebig teaches a cooling system in accordance with claim 1, whereby the piping system includes a closed pipe ("heat pipe 10," col. 1, line 49), of which one end section is the heat intake section and of which the other end section is the heat output section, whereby both end sections are connected to one another via the conveyance section (see figure).

Claim 3: Kroebig teaches a cooling system in accordance with claim 1, whereby the heat source includes at least one component of an electronic device in the aircraft (component 12, figure), an on-board kitchen in the aircraft, a surface requiring cooling in the aircraft, or similar.

Claim 4: Kroebig teaches a cooling system in accordance with claim 1, whereby the heat sink includes a section of an external wall of the aircraft ("cover 14 which forms part of the missile skin 16," col. 1, line 51; figure), an aircraft structure, an aircraft bilge, an air channel, in particular a ram air channel, or a heat exchanger.

Claim 5: Kroebig teaches a cooling system in accordance with claim 1, whereby the heat transfer in the heat intake section and/or in the heat output section takes place by means of a heat exchanger which couples the heat source and the heat sink with the piping system. The walls of the heat pipe are considered to be a heat exchanger in that they do thermally couple the heat source and sink with the piping system.

Claim 6: Kroebig cooling system in accordance with claim 5, whereby the heat flow transferred is controlled by the respective heat exchanger. Col. 2, lines 19-29 describe a cutoff action where, when the heat given off by the walls of the pipe heats air in the chamber 29 past a design temperature, bellows 31 expand and cut off the flow of the working fluid, which "substantially reduces the heat flow," (col. 2, lines 27-28). Though this cutoff is meant to forestall the reversal of the cooling system taught by Kroebig, it is considered to control the heat flow transferred, and be initially controlled by the heat of the walls of the heating pipe.

Claim 13: Kroebig teaches a cooling system in accordance with claim 1, whereby a cold storage unit (chamber 29, col. 2, line 3; figure) is provided between the heating source and the heat sink. The camber 29, is taught to store a bellows containing "a gas such as air," (col. 2, line 6) and is considered to comprise a cold storage unit, especially since the relative cool temperature of the gas contained within the bellows 31 is critical to the functioning of the cooling system taught by Kroebig.

Claim 14: Kroebig teaches cooling system in accordance with claim 1, whereby a cold storage unit is provided in the section of the heat source. The chamber 29 is considered a cold storage unit as described in the rejection to claim 13, and as it is taught to be provided in the interior of the missile as shown in the sole figure, it is considered to be provided in the section of the heat source.

Claim 15: Kroebig teaches a cooling system in accordance with claim 1, whereby the piping system forms a closed circuit which connects the heat source and the heat

sink by means of a feed line (heat pipe 10) and a discharge line (wick 22) respectively (see figure).

Claim 16: Kroebig teaches a cooling system in accordance with claim 13, whereby the cold storage unit (chamber 29) is located in a special circuit (the chamber is considered to be in a reaction circuit comprising bellows 31 and spring 35) with a special piping system (bellows 31 contain air or “a heat expandable fluid," [col. 2, line 7] and are considered a special piping system).

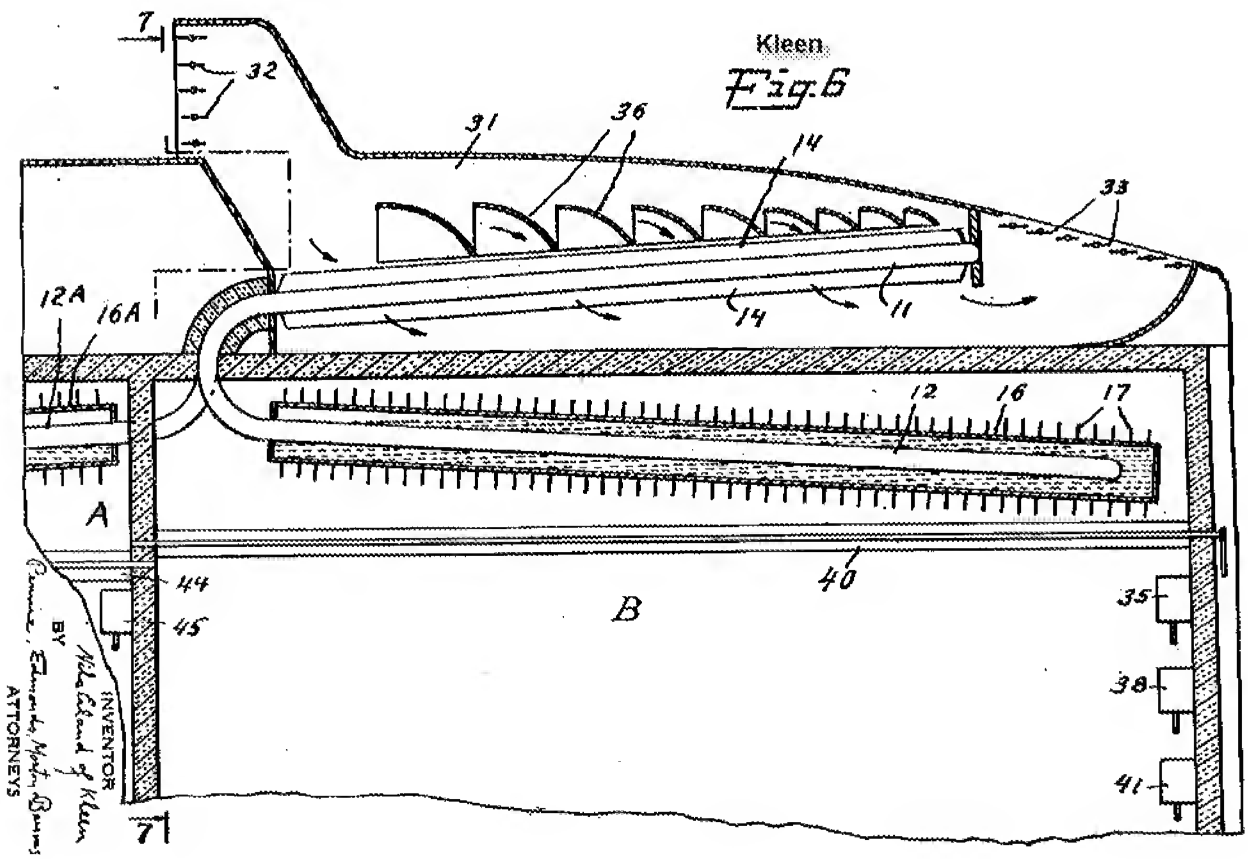
Claim 17: Kroebig teaches cooling system in accordance with claim 13, whereby when the aircraft is in rest condition, the heat sink is located geodetically higher than the cold storage unit and the heat source. Because the cooling system taught by Kroebig “effectively acts as a heat pipe diode" (col. 2, line 31), the heat sink must be geodetically higher than the heat source in order for the cooling system to function, but regardless, some portion of the skin of the missile will be geodetically higher than the chamber 29 and the component 12 in any possible rest condition.

Claim 18: Kroebig teaches a method for the discharge of heat from a heat source (component 12, figure) located in the interior of an aircraft (a missile) to a heat sink (missile skin 16, figure), whereby a piping system sealed against the surrounding atmosphere (heat pipe 10, figure), which is thermally coupled to a heat intake section (“evaporator section 19," col. 1, line 57) with the heat source and is thermally coupled to a heat output section (“the heat pipe cover ... acts as the condenser,“ col. 2, lines 11-13) with the heat sink (col. 1, line 51- col. 2, line 10), and which preferably has an essentially adiabatic conveyance section ("wick 22," col. 1, line 55), is filled with a heat

conveyance medium ("liquid 21," col. 1, line 54) which, when heat is taken from the heat source in the heat intake section undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section and here, when heat is discharged to the heat sink condenses again and flows back into the heat intake section ("as the component temperature increases, it causes an evaporation of the working fluid which flows to the missile skin where it condenses giving up its latent heat. The condensate is returned to the evaporator through the wick," col. 2, lines 13-18).

Claims 1-7 and 10-18 are rejected under 35 U.S.C. 102(b) as being anticipated by US-2499736 to Kleen.

Kleen



Claim 1: Kleen teaches a cooling device ("refrigerating system," col. 1, line 44) for expelling heat from a heat source located in the interior of an aircraft ("cargo space," col. 1, line 55) to a heat sink ("low-temperature ambient air," col. 2, lines 18-19), with a piping system sealed against the surrounding atmosphere ("hermetically confined within a closed circuit or tube" col. 1, lines 48-50), which is thermally coupled ("thermally associated," col. 1, line 52) to a heat intake section ("vaporizing zone," col. 1, line 52) with the heat source ("cargo space," col. 1, line 55) and to a heat output section ("liquefying zone," col. 1, lines 50-51) with the heat sink, and which preferably has an essentially adiabatic conveyance section ("intermediate connecting section 13," col. 2, lines 47-48; fig. 1), whereby the piping system is filled with a heat conveyance medium ("vaporizable refrigerating medium or agent," col. 1, lines 48-49) which, when it takes in heat from the heat source in the heat intake section undergoes a transition from the liquid phase to the gaseous phase (col. 3, lines 10-11), then flows into the heat output section (col. 3, lines 13-14) and here, when discharging heat to the heat sink (col. 3, lines 14-16), condenses once again (col. 3, lines 14-15) and flows back into the heat intake section (col. 3, lines 16-17).

Claim 2: Kleen teaches a cooling system in accordance with claim 1, whereby the piping system includes a closed pipe ("closed circuit or tube," col. 1, lines 48-50), of which one end section is the heat intake section (fig. 6, item 11) and of which the other end section is the heat output section (fig. 6, item 12), whereby both end sections are connected to one another via the conveyance section (fig. 6, visible bend in pipe).

Claim 3: Kleen teaches a cooling system in accordance with claim 1, whereby the heat source includes at least one component of an electronic device in the aircraft, an on-board kitchen in the aircraft, a surface requiring cooling in the aircraft, or similar (col. 2, lines 4-5 describe cooling “perishable merchandise," which is considered a heat source requiring cooling).

Claim 4: Kleen teaches a cooling system in accordance with claim 1, whereby the heat sink includes a section of an external wall of the aircraft, an aircraft structure, an aircraft bilge, an air channel, in particular a ram air channel, or a heat exchanger. The heat sink taught by Kleen in flight is ambient outside air conveyed through a duct (col. 7, lines 57-60), and figure 6 displays an air channel defined by intake 32 and outlet 33.

Claim 5: Kleen teaches a cooling system in accordance with claim 1, whereby the heat transfer in the heat intake section (fig. 6, vaporizing zone 12) and/or in the heat output section (fig. 6, liquefying zone 11) takes place by means of a heat exchanger which couples the heat source (fig. 6, cargo space B) and the heat sink (ambient air from inlet at 32) with the piping system (fig. 6, pipe continuous through 11, 13 and 12; "closed circuit or tube," col. 1, 48-50). Col. 2, lines 52-55: “The liquefying and vaporizing zones 11 and 12 are provided with extended heat transfer surfaces or fins 14 and 15, respectively," and fins 17 (fig. 6) are also described as heat transfer surfaces for vaporizing zone 12 in col. 3, lines 7-9.

Alternatively, heat transfer in the heat output section is taught in figure 6 to take place through the contact of heat transfer surface 14 with the flow of ambient air through

shutters 32 and 33, said shutters are taught to be controllable by a “thermostat or other temperature responsive device 38," in col. 6, lines 43-72, and heat transfer in the heat intake section is taught to take place through contact of cabin air with fins 17 (fig. 6), where the flow of said air is controlled by longitudinal shutters 40, which are taught to be controlled by thermostat 41 through actuator 42 and linkage 43. The combination of shutters 32, 33, heat transfer surface 14 and cold accumulator 16 is considered to form a heat exchanger coupling the heat sink to the heat output section, and the system of shutters 40, thermostat 41, fins 17 and associated actuators and linkages are considered to form the heat exchanger for the heat intake section.

Claim 6: Kleen teaches a cooling system in accordance with claim 5, whereby the heat flow transferred is controlled by the respective heat exchanger. Heat flow transferred is considered to be controlled by respective heat exchangers in that the heat exchangers both control the amount of heat-bearing airflow allowed in or out, respectively.

Claim 7: Kleen teaches a cooling system in accordance with claim 6, whereby a ventilator is assigned to the respective heat exchanger, by means of which the transfer of heat between the heat exchanger and the heat source is controlled. Kleen teaches an additional local cooling system which blows cold air through duct 31 (fig. 6) "until the cargo compartments are sufficiently refrigerated” (col. 7, lines 39-42). Said cooling system by the blowing of air can be considered to comprise a ventilator assigned to the heat exchanger for the heat outlet, which is considered to control the transfer of heat between the heat exchanger and the heat source (cargo compartments) in that the

cooling system blows cold air across the heat exchanger until the heat source reaches the desired temperature. Said cooling system can additionally be considered to comprise a ventilator assigned to the heat exchanger for the heat intake, in which case the transfer of heat between this heat exchanger and the heat source is controlled by the cooling system in that this transfer would take place at a faster or slower rate depending on the temperature of the cooling air and whether the local cooling system is on or off.

Claim 10: Kleen teaches a cooling system in accordance with claim 1, whereby a temperature sensor (fig. 6, thermostat 38 or 41) is located in the section of the heat source (both 38 and 41 are in compartment B), whereby the cooling system is controlled with reference to the temperature recorded by the temperature sensor (both 38 and 41 are taught to control parts of the cooling system by the temperature recorded therein: 38 in col. 6, lines 54-72; 41 in col. 7, lines 17-32).

Claim 11: Kleen teaches a cooling system in accordance with claim 10, whereby the ventilator and/or the regulator valve is controlled in accordance with the temperature recorded by the temperature sensor. Ventilators as described by “local cooling system” (col. 7, lines 39-43) are taught to be controlled by the temperature in the cabin area, which is considered to be read by one of the temperature sensors inside. Alternatively the shutters at 32 and 33 in fig. 6 are taught to be controlled by the temperature recorded by sensor 38 (col. 6, lines 54-72) and can be considered to form a ventilator.

Claim 12: Kleen teaches a cooling system, in accordance with claim 11, whereby a regulation device is provided, which controls the ventilator and/or the regulator valve

in accordance with the temperature recorded by the temperature sensor. In the case of the ventilator comprising shutters at 32 and 33, said shutters are taught to be controlled by an actuating mechanism, which is controlled by temperature sensor 38 (col. 7, lines 4-10).

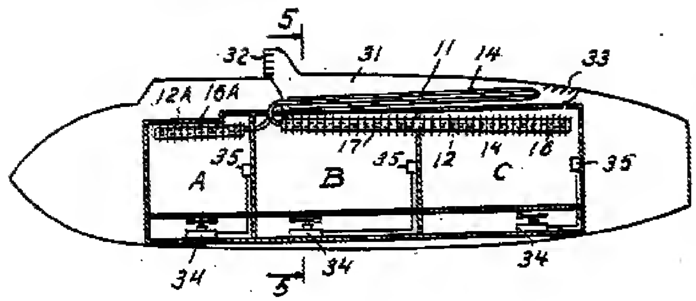
Claim 13: Kleen teaches a cooling system in accordance with claim 1, whereby a cold storage unit is provided between the heating source and the heat sink. Cold accumulator 16 is considered to act as a cold storage unit, and is located between the heating source and the heat sink, as visible in fig. 6.

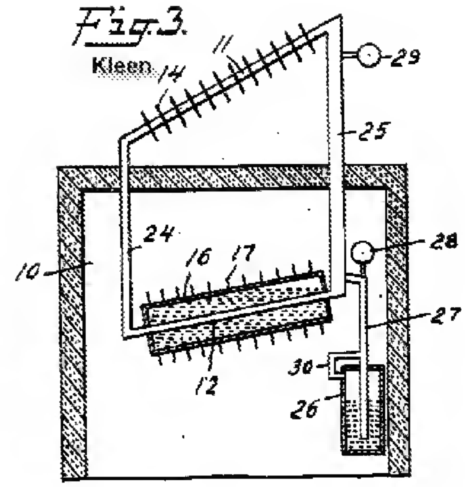
Alternatively, if the heat source from claim 1 is considered to be compartment A (fig. 6), an analogous cooling system is taught for compartment A (col. 5, line 68-col. 6, line 3; fig. 6), and compartment B can be considered to form a cold storage unit provided between heating source A and the heat sink.

Claim 14: Kleen teaches a cooling system in accordance with claim 1, whereby a cold storage unit is provided in the section of the heat source. Cold accumulator 16 is considered to be in the section of the heat source.

Claim 15: Kleen teaches a cooling system in accordance with claim 1, whereby the piping system forms a closed circuit (fig. 3) which connects the heat source and the heat sink by means of a feed line ("vapor tube 25" col. 5, line 10; fig. 3 and a discharge line ("liquid return tube 24" col. 5, line 7; fig. 3) respectively.

Kleen Fig.4.





Claim 16: Kleen teaches a cooling system in accordance with claim 13, whereby the cold storage unit is located in a special circuit with a special piping system. In the case where the heat source is considered at A and the cold storage unit at B, the cold storage unit can be considered to have a special piping system shown by the pipes in the forefront of fig. 6, and more visible as a separate piping system in fig. 4. This separate piping system when combined with its associated heat exchangers is considered to comprise a special circuit.

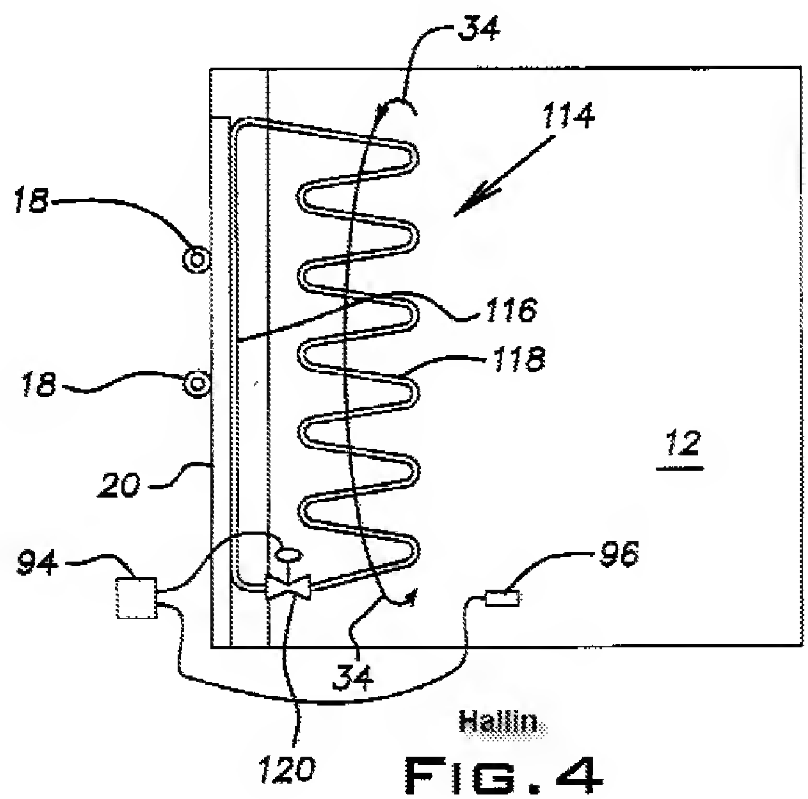
Claim 17: Kleen teaches a cooling system in accordance with claim 13, whereby when the aircraft is in rest condition, the heat sink is located geodetically higher than the cold storage unit and the heat source. This is visible in figures 4 and 6, when the heat sink is considered as the ambient air flowing through duct 31.

Claim 18: Kleen teaches a method for the discharge of heat from a heat source located in the interior of an aircraft to a heat sink, whereby a piping system sealed against the surrounding atmosphere, which is thermally coupled to a heat intake section with the heat source and is thermally coupled to a heat output section with the heat sink,

and which preferably has an essentially adiabatic transport section, is filled with a heat conveyance medium which, when heat is taken from the heat source in the heat intake section undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section and here, when heat is discharged to the heat sink condenses again and flows back into the heat intake section.

The cooling structure taught by Kleen and described in response to claim 1 is considered to discharge heat from a heat source located in the interior of an aircraft to a heat sink in the manner described above.

Claims 1, 8-12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by US-5966951 to Hallin et al. (hereafter Hallin).



Hallin
FIG.4

Claim 1: Hallin teaches a cooling device (fig. 4) which is considered capable of expelling heat from a heat source located in the interior of an aircraft to a heat sink, with a piping system (fig. 4, 114) sealed against the surrounding atmosphere, which is thermally coupled to a heat intake section (fig. 4, 118) with the heat source (fig. 4, 12) and to a heat output section (fig. 4, 116) with the heat sink (fig. 4, 20), and which preferably has an essentially adiabatic conveyance section (such as the top pipe near arrow 34), whereby the piping system is filled with a heat conveyance medium ("refrigerant vapor," col. 4, lines 21-22) which, when it takes in heat from the heat source in the heat intake section undergoes a transition from the liquid phase to the gaseous phase (col. 4, lines 28-31), then flows into the heat output section and here, when discharging heat to the heat sink, condenses once again and flows back into the heat intake section (col. 4, lines 38-45).

Claim 8: Hallin teaches a cooling system in accordance with claim 1, whereby the flow of heat conveyance medium is controlled between the heat intake section and the heat output section (col. 6, lines 35-60 describe control of the flow of a heat conveyance medium between the heat intake and output sections).

Claim 9: Hallin teaches cooling system in accordance with claim 8, whereby a regulator valve (fig. 4, 120) is assigned to the cooling system, by means of which the quantity of heat conveyance medium flowing to and/or from the heat exchanger is controlled (col. 6, lines 35-60 describe how the valve 120 controls the quantity of heat conveyance medium flowing to or from the heat exchanger).

Claim 10: Hallin teaches a cooling system in accordance with claim 1, whereby a temperature sensor (fig. 4, 96) is located in the section of the heat source, whereby the cooling system is controlled with reference to the temperature recorded by the temperature sensor (col. 6, lines 39-40, 46-60 describe how cooling system is controlled with reference to the temperature recorded by the temperature sensor).

Claim 11: Hallin teaches a cooling system in accordance with claim 10, whereby the ventilator and/or the regulator valve is controlled in accordance with the temperature recorded by the temperature sensor. The regulator valve 120 is controlled by controller 94 based on the temperature recorded by sensor 96 as described in col. 6, lines 39-40.

Claim 12: Hallin teaches a cooling system, in accordance with claim 11, whereby a regulation device (fig. 4, controller 94) is provided, which controls the ventilator and/or the regulator valve (fig. 4, 120) in accordance with the temperature recorded by the temperature sensor (col. 6, lines 39-40).

Claim 15: Hallin teaches a cooling system in accordance with claim 1, whereby the piping system forms a closed circuit (fig. 4) which connects the heat source (fig. 4, 12) and the heat sink (fig. 4, 20) by means of a feed line (top half of pipe 114) and a discharge line (bottom half of pipe 114) respectively.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-4044396 to Haws et al. teaches a heat pipe cooling system for radar equipment in an aircraft utilizing a working fluid and using ambient air as a heat sink.

GB-1595961 to Thorn Automation Ltd (Walker) teaches a cooling system for cooling electrical equipment.

GB-1526160 to Ericsson Telefon teaches a cooling system for cooling electronic equipment on an airplane.

US-5702073 to Fluegel teaches a liquid cooling system for cooling aircraft electronics equipment where the heat sink is the skin of the aircraft.

US-3929305 to Sabol teaches a pump-free heat exchange system utilizing a heat conveyance medium which undergoes phase transition to cool the outer skin or leading edge of an aircraft.

NO-320664 to Aflekt et al. teaches a vapor compression system for heating and cooling of vehicles (associated US application US-20050103487 is in English).

US-4786015 to Niggemann teaches a cooling unit for cooling the leading edge of a hypersonic aircraft.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard R. Green whose telephone number is (571)270-5380. The examiner can normally be reached on Monday - Thursday 7:00 am - 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly D. Nguyen can be reached on (571)272-2402. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kimberly D Nguyen/
Supervisory Patent Examiner, Art Unit 4174

/R. R. G./
Examiner, Art Unit 4174